

Please amend the claims as follows:

1. (currently amended) A method to increase the safety integrity level of a ~~Controller~~
(10) controller for control of real world objects, ~~characterized by, the method comprising:~~

attaching to the said single (~~1-channel~~) ~~Controller~~ (10) controller a safety-hardware unit
(11) wherein the safety hardware unit (11) communicates with ~~the said Controller's CPU a~~
central processing unit of the controller,

downloading safety-related configuration data and/or diagnostic information to the
attached safety-hardware unit (11) and downloading the control function software to the
~~Controller~~ (10) controller,

configuring the attached safety-hardware unit (11) to execute logic, which depends on the
downloaded safety-related configuration data and/or diagnostic information, and in an active or
passive way set ~~the Controller's~~ (10) output values of the controller to a safe state for online
safety control.

2. (currently amended) ~~A~~ The method according to claim 1, ~~characterized in that~~
wherein the ~~Controller~~ (10) ~~have~~ controller has the capability of executing a set of non-safety
critical control functions, which set of non-safety critical control functions is the same before as
well as after the safety hardware unit (11) is attached.

3. (currently amended) ~~A~~ The method according to claim 2, ~~characterized in that~~

wherein the configuring step ~~comprise the additional steps or~~ comprises:

downloading to the attached safety hardware unit (11) diagnostic information, which previously was automatically generated by a software tool as a result of user's configuration of the ~~Controller (10)~~ controller and which diagnostic information is used in the attached safety hardware unit (11) during safety critical control.

4. (currently amended) A The method according to ~~any previous claim, characterized in that claim 1, wherein~~ access to a plurality of input and output values of a real world object is obtained through a bus (14) connected between the ~~Controller (10)~~ controller and to an input/output unit (15) and the validity of the bus (14) communication is verified in the attached safety hardware unit (11).

5. (currently amended) A The method according to ~~any previous claim, characterized in that claim 1, wherein~~ the timing supervision of the ~~Controller (10)~~ controller is verified in the attached safety hardware unit (11).

6. (currently amended) A The method according to ~~any previous claim, characterized in that claim 1, wherein~~ correct sequence of code logic is verified in the attached safety hardware unit (11).

7. (currently amended) A The method according to ~~any previous claim, characterized in that claim 1, wherein~~ correctness of memory content of the controller (10) is verified in the attached safety hardware unit (11).

8. (currently amended) A The method according to ~~any previous claim, characterized in that~~ claim 1, wherein a download of new control functionality logic to the ~~Controller~~ controller is verified in the attached safety hardware unit (11).

9. (currently amended) A The method according to ~~any previous claim, characterized in that~~ claim 1, wherein the attached safety hardware unit (11) performs checks in order to allow only users logged on as safety classified engineers and safety classified operators to modify the control functionality logic and parameters.

10. (currently amended) A The method according to claim 4, ~~characterized in that~~ wherein the bus (14) communication verification logic in the attached safety hardware unit (11) is implemented diverse.

11. (currently amended) A The method according to claim 4, ~~characterized in that~~ wherein the attached safety hardware unit 11 is diverse generating a safety related header for the bus (14) communication.

12. (currently amended) A The method according to claim 11, ~~characterized in that~~ wherein the ~~Input/Output~~ input/output unit (15) has two diverse implementations each verifying the correctness of the bus (14) traffic and each generating a safety related header for the bus communication.

13. (currently amended) A ~~The~~ method according to ~~any previous claim, characterized in that~~ claim 1, wherein the attached safety hardware unit ~~comprise~~ comprises a first and a second module in a redundant configuration, the second module is updated with data that exists first module at the time of a failure and the second module takes over the safety related control of the control system from the first module if a failure of the first module is detected.

14. (currently amended) A ~~The~~ method according to claim 13, ~~characterized in that~~ wherein the a redundant ~~Controller~~ controller unit is attached to the ~~Controller (10)~~ controller, which takes over in case of a failure of a primary ~~Controller~~ controller and the redundant ~~Controller~~ controller unit establish communication with either the active first module or the active second module of the attached safety hardware unit.

15. (currently amended) A single or 1-channel ~~Control System (20)~~ control system intended for safety-related control of real-world objects, comprising: ~~characterized in that,~~ a single main CPU central processing unit handling the main processes of a ~~Controller (10)~~ controller,

an attached safety-hardware unit (11) comprising means to increase the safety-integrity level of the ~~Controller~~ controller and comprising means to set ~~the Controller's~~ output values of the controller in a safe state for online safety control.

16. (currently amended) A ~~Control System~~ The control system according to claim 15, ~~characterized in that~~ wherein the ~~Controller (10)~~ controller has the capability of executing a set of non-safety critical control functions, which set of non-safety critical control functions is

the same before as well as after the safety hardware unit is attached.

17. (currently amended) ~~A Control System~~ The control system according to claim 16, ~~characterized in that it comprises,~~ further comprising:

means for downloading to the attached safety hardware unit diagnostic information, which previously was automatically generated by a software tool as a result of user's configuration of the ~~Controller~~ controller and which diagnostic information is used in the attached safety hardware unit during safety critical control.

18. (currently amended) ~~A Control System~~ The control system according to claim 17, ~~characterized in that it comprises~~ further comprising:

an input/output unit (15) connected to the ~~Controller (10)~~ controller by a bus and the validity of the bus (14) communication is verified in the attached safety hardware unit.

19. (currently amended) ~~A Control System~~ The control system according to claim 18, ~~characterized in that~~ wherein the bus (14) communication verification logic in the attached safety hardware unit (11) is implemented diverse.

20. (currently amended) ~~A Control System~~ The control system according to claim 19, ~~characterized in that~~ wherein the attached safety hardware unit (11) is diverse generating a safety related header for the bus (14) communication.